

DELAWARE BRIDGE NO. 179A
Evanson Road (N285) spanning Mill Creek
Hockessin
New Castle County
Delaware

HAER No. DE-43

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, P.A. 19106

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DELAWARE BRIDGE NO. 179A

Location: Evanson Road (N285) spanning Mill Creek, Hockessin,
New Castle County, Delaware

USGS Quad: Kennett Square, PA.-DEL.
UTM 18.439870.4403680

Date of
Construction: Between 1873 and 1900. Known rehabilitation 1926 and
1982.

Present Owner: Delaware Department of Transportation
P.O. Box 778
Dover, Delaware 19903

Present Use: Riverine crossing for vehicle, bicyclists, and
pedestrians.

Significance: Delaware Bridge No. 179A was one of six intact historic
metal truss highway bridges in Delaware. Structurally
similar to Delaware Bridge No. 66 and 424 and produced
by the prominent Edge Moor Iron Company of Wilmington,
DE, Delaware Bridge No. 179A may be a product of
that manufacturer as well. Structures like Delaware
Bridge No. 179A also played a vital role in the
economic development of rural, farming, and crossroad
areas during the last quarter of the 19th century and
well into the 20th century, as local transportation
networks underwent initial phases of development.

Project
Information: This document was undertaken in April of 1995, in
response to emergency bridge replacement repairs.
Structural and strength failures within the metal
truss, decking/floor beams, abutments, and approach
roadways have warranted partial removal and replacement
of the bridge's structural components.

This document was prepared in May of 1995 by the
Delaware Department of Transportation (DelDOT), Dover,
DE: Michael C. Hahn, Senior Highway Planner in DelDOT's
Location & Environmental Studies Office; Tim O'Brian,
Photographer in DelDOT's External Affairs Office.

Constructed as a riverine crossing elimination, Delaware Bridge No. 179A carries Evanson Road (N285) over Mill Creek. The one lane bridge is a 20'-0" Warren pony truss that is divided into two equal panels. The top and bottom chords are made of double 3" angles; posts are 2 ½" angles, and diagonals are double 2 ½" angles. A transverse floor beam (8" I-Section) is located at the intermediate panel point; eight longitudinal girders support the steel grate deck (which is not original, it was timber), which measures 12'-10" curb to curb and carries one lane of traffic. The superstructure is supported on the original semicoursed rubble stone abutments (north end was rebuilt 1926 under contract BNC-52); there is only one wing wall, on the south east elevation, of uncoursed rubble masonry and flared configuration.

Delaware Bridge No. 179A was significant as one of six intact historic metal highway bridges in Delaware. Although few metal truss bridges remain in Delaware, the Delaware Department of Transportation photographic archives for the 1920s illustrate approximately ninety metal truss bridges in New Castle County. In its Warren pony truss configuration employing standardized members, Delaware Bridge No. 179A is typical of the small spans erected along local roadways in rural areas throughout the country in response to increasing traffic in the late-nineteenth and early-twentieth centuries. The metal truss bridge type offered several advantages in its application. It was adaptable to a wide variety of site conditions, its structural behavior was scientifically understood, and its prefabricated components made it easy and economical to manufacture, shop, and erect. Structures like Delaware Bridge No. 179A played a vital role in the economic development of rural areas during the last quarter of the nineteenth century and well into the twentieth century, as local transportation networks underwent development. The Warren truss was patented in 1848 by two British engineers, James Warren and Willoughby Monzoni. The original form of a Warren truss was series of equilateral triangles and such as such represents on the earliest truss types. Later modifications included subdivision by vertical, as seen by Delaware Bridge No. 179A, or the addition of alternative diagonals.

Results of a Delaware's 1991 historic bridge survey confirm that limited number of Pratt and Warren Trusses are of simple and small spans. This commonly built type exemplifies the continuing expansion and improvement of a former cow and dirt road farming path (i.e. Evanson Road) into a road network improvement under the auspices of the Delaware State Highway Department.

Delaware Bridge No. 179A was significant as one of six intact historic metal truss highway bridges in Delaware and is nearly identical to Delaware Bridge No. 66 and 424 in New Castle County. Delaware Bridge No. 179A was produced by the prominent Edge Moor Iron Company of Wilmington, DE.

The Edge Moor Iron Company was incorporated in 1869 as an iron mill for the manufacture of iron for general purposes. Under the direction of president William Sellers, the company evolved into a manufacturer of structural iron and steel for bridges, viaducts and roof work. In 1873, the Edge Moor Bridge Works was established for the fabrication of bridges. In 1879, the company diversified by including boilers as one of their products. The Edge Moor Bridge Works was operational until 1900 when it was acquired by the American Bridge Company. Edge Moor was one of twenty-four companies purchased by J.P. Morgan's American Bridge Company in 1900. At that time, American Bridge Company purchased the 14 acre parcel from the Edge Moor Bridge Works and assumed control of the bridge manufacturing operations while the Edge Moor Iron Company concentrated on the production of Galloway Boilers. American Bridge Company operated the bridge division at Edge Moor for a time, but then consolidated its holdings at its Ambridge, Pennsylvania location.

Although original contract plans detailing truss configuration of Delaware Bridge No. 179A do not exist, small truss bridges, like Delaware Bridge No. 179A, are prefabricated components making it relatively easy and simple to construct. In fact, small truss spans can be fabricated, assembled, shipped, and quickly erected on the completed substructure which was often constructed by local labor. Therefore, it is believed that the New Castle County Levy Court, directed by the County Engineer's Office commissioned Edge Moor Bridge Works for the structural components and had local labor erect the structure. Delaware Bridge No. 66 and 424 were also ordered by the Edge Moor Bridge Works by New Castle County Levy Court and have no plans or dates detailing construction, too. Since Edge Moor Bridge Works had concentrated on bridge manufacturing between 1873 and 1900, Delaware Bridge No. 179A is believed to be originally constructed during this period.

Minor repairs amounting to \$340.00 were performed in 1926 under Contract No. BNC-52. The plans, drawn by the New Castle County Engineer's Office, are on file at the Delaware Department of Transportation. These plans call for the reconstruction of one rubble

masonry abutment and the underpinning of the other. No details of the truss and supporting members were drawn.

In April of 1970, State Contract 70-04-001 included cleaning a repainting of the bridge by Marinis Brothers, Inc. of Wilmington, DE for \$700.00.

According to The Delaware Department of Transportation's (DelDOT) Bridge Maintenance Files, other known repairs include a June 1982 replacement of the timber deck with a single steel grate deck approximately 16' long. All steel stringers and floor beams were replaced in-kind, too. These repairs were accomplished under DelDOT's North District Maintenance which did not support a contract number or plan sheet.

Other minor work known includes parging, repointing, and/or sealing cracks within the stone abutments with concrete mortar as well as tightening or replacing loose or missing bolts within the floor beams. These tasks were undertaken in May and August of 1991 by DelDOT's North District Maintenance which did not support a contract number or plan sheet.

The present appearance and structural integrity of the substructure and superstructure showed evident signs of failure, warranting its closure and immediate replacement during the most recent bridge inspection performed on March 20, 1995.

This inspection report found: missing and loose bolts in the timber curbs; damaged end posts at both the northwest and southeast corners; the southeast wingwall and abutment were severely cracked and out of plumb; missing stone was present at the southwest abutment corner; rotation of the southwest abutment wall; eroding approach roadway slopes; and severe scouring around the abutment area.

The bridge truss components were also cracked and missing rivet heads. More specifically, the top and bottom chords on the east truss were twisted or severely rusted and were out of horizontal plane. Stringers were found tilted and distorted because they had vertically moved and twisted. The west truss was in fair shape, but early signs of twisting/bending were evident.

The following photographs on pages 10-14 were taken in the field during the time of inspection.

After DelDOT Bridge Officials were contacted that day regarding the bridges's rating and structural condition, the bridge was closed to traffic at 1:30pm. Since Evanson Road was currently being used as an detour route for the reconstruction of Valley Road, located northwest off Evanson Road, emergency repairs were immediately scheduled to replace the bridge and repair the supporting abutment system.

Two days later (March 22, 1995) emergency work began on replacing the entire deck system and repairing the abutments. This work included, repointing stone masonry abutments along/within the waterline, rebuilding/rehabilitating of the abutment system at approach roadway levels, sealing all abutment cracks by grouting, and restabilizing approach roadway.

The entire steel truss was left in place while all supporting members (i.e., stringers, cross bracing, and steel grate deck) were replaced. The truss, itself, was cleaned and repainted while a laminated timber deck was constructed across the waterway. Instead of the truss supporting live loads, the ends of the single span timber deck rest on the rebuilt abutments, making the structural function of the truss obsolete. The truss only remains as part of the guide rail/parapet system. A hot mix overlay was the final addition.

The following photographs on pages 15-18 were taken in the field during the time of bridge reconstruction/replacement.

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